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Indian Standard

SPECIFICATION FOR MARINE GUARDRAILS AND STANCHIONS

PART I GUARDRAILS FOR SHIPS

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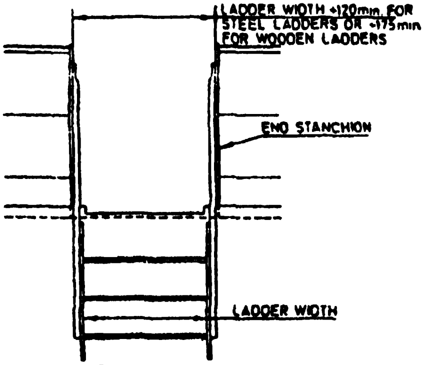
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

November 1980

AMENDMENT NO. 1 JULY 1996
TO
IS 9448 (Part 1) : 1980 SPECIFICATION FOR MARINE GUARDRAILS, STANCHIONS

PART 1 GUARDRAILS FOR SHIPS

(*Page* 13, *Fig.* 7) — Substitute the following figure for the existing: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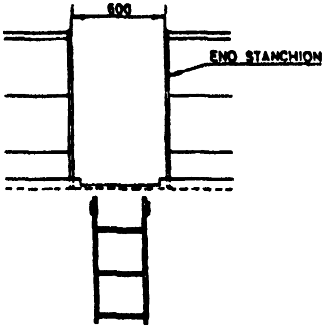
END STANCHION
LADDER WIDTH

ARRANGEMENT AT SLOPING LADDERS



ARRANGEMENT AT VERTICAL LADDERS

All dimensions in millimetres

FIG. 7 TYPICAL ARRANGEMENTS OF GUARDRAILS AT LADDERS

(TED 17)

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Indian Standard
SPECIFICATION FOR MARINE GUARDRAILS AND STANCHIONS

PART I GUARDRAILS FOR SHIPS

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Indian Standard

SPECIFICATION FOR MARINE GUARDRAILS AND STANCHIONS

PART I GUARDRAILS FOR SHIPS

0. FOREWORD

0.1 This Indian Standard (Part I) was adopted by the Indian Standards Institution on 29 February 1980, after the draft finalized by the Shipbuilding Sectional Committee had been approved by the Marine, Cargo Movement and Packaging Division Council.

0.2 This standard specifies requirements for marine guardrails and stanchions for cargo ships to comply with the regulations of the International Convention on Loadlines 1966, Chapter II, Regulation 25, Parts 2 and 3.

0.3 Users of this standard should note that while observing the requirements of the standard, they should at the same time ensure compliance with such statutory requirements, rules and regulations as may be applicable to the individual ship concerned.

0.4 This standard is being issued in three parts. Other parts in the series are:

a) Part II Gates and portable guardrail sections for ships; and
b) Part III Storm rails (exterior).

0.5 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard (Part I) specifies dimensions, materials, quality of manufacture and finish for guardrails and stanchions which are fitted on exposed freeboard and superstructure decks of sea-going ships to prevent personnel falling overboard or to lower decks and also for handrails at ladder positions.

---

*Rules for rounding off numerical values (*revised*).

1.1.1 This standard does not specify guardrails which are fitted near compasses.

2. TERMINOLOGY

2.0 For the purpose of this standard, the following definitions shall apply.

2.1 Guardrail — A construction comprising stanchions, rails, toprails and stays (*see* Fig. 1 and 5).

2.2 Stanchion — The principal vertical structural member of a guardrail system.

2.3 Rails and Toprails — Rails are the horizontal members between stanchions, the toprail being the uppermost rail in a series of rails.

2.4 Stay — A secondary structural support attached to stanchions and deck.

3. MATERIALS

3.1 The materials for the manufacture of individual components shall be as given in Table 1.

4. DESIGN, CONSTRUCTION AND INSTALLATION

4.1 Principal Dimensions

4.1.1 The height of the toprails shall be at least 1 000 mm. This dimension shall be measured from the top of the toprail to the deck at a point vertically below the inner edge of the toprail, or if the deck has a waterway, to the top of the deck plank or covering next to the waterway (*see* Fig. 1 to 4).

4.1.2 The opening below the lowest course of rails shall be a maximum of 230 mm, measured from the underside of the rail to the deck or flat bar side plate, where fitted (*see* Fig. 1 to 3).

4.1.3 The opening between the upper courses shall be a maximum of 380 mm (*see* Fig. 1).

4.1.4. The maximum clear distance between stanchions shall be 1 500 mm (*see* Fig. 5).

4.1.5 The dimensions of guardrails and stanchions, constructed in accordance with this standard shall be as set out in Fig. 1 to 7.

TABLE 1 COMPONENTS AND MATERIALS OF GUARDRAILS

(*Clause* 3.1)

Sl No.	Component	Material	Relevant IS : Number	Remarks
i)	Stanchions	Mild steel	IS : 2062-1969†	Weldable
ii)	Stays	Mild steel	IS : 2062-1969†	Weldable
iii)	Toprails, tube	Steel	IS : 1239 (Part I)-1979‡	—
	Toprails, wooden	Teak	—	Or other suitable hardwood
iv)	Rails	Steel	IS : 2062-1969†	Weldable
v)	Washers*	Brass or steel	IS : 2016-1967§	—
vi)	Nuts*	Brass or steel	IS : 7002-1973‖	—
vii)	Bolts*	Steel	IS : 1363-1967¶	—
viii)	Screws*	Brass or steel	—	Wood screws

*To be galvanized.

†Specification for structural steel (fusion welding quality) (*first revision*).

‡Specification for mild steel tubes, tubulars and other wrought steel fittings: Part I Mild steel tubes (*third revision*).

§Specification for plain washers (*first revision*).

‖Mechanical performance requirements of prevailing torque type steel hexagon lock nuts.

¶Specification for black hexagon bolts, nuts and lock nuts (diameter 6 to 39 mm) and black hexagon screws (diameter 6 to 24 mm) (*first revision*).

4.2 Stanchions

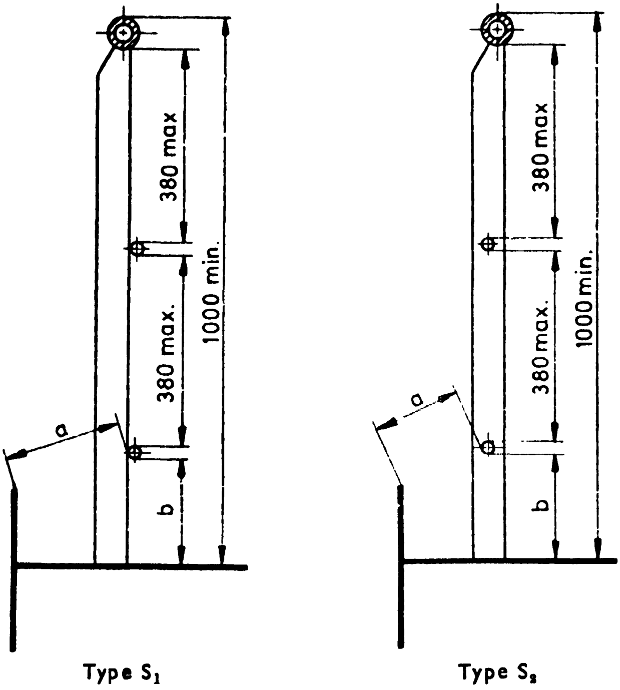
4.2.1 Stanchions for guardrails shall be of 60 × 16 mm steel flat bar or of flat bar having a section modulus at least equal to that of 60 × 16 mm flat bar and shall be welded to the deck and side plate.

4.2.2 Stanchions shall be erected vertically.

4.2.3 Stanchions shall not be welded to the top edge of the sheer strake within 0·5 L amidships, but shall be welded to the deck clear of the sheer strake [*see* Fig. 2 (Type A)].

4.2.4 On decks with rounded gunwales, stanchions shall be welded to the flat portion of the deck clear of welded plate seams [*see* Fig. 2 (Type B)].

4.2.5 Stanchions on fore and aft gangways of tankers shall be fabricated to suit the gangway structure and should be in general accordance with Fig. 3 (Type E).



NOTE — The opening *a* or *b* below the lowest course of the guardrails shall not exceed 230.

All dimensions in millimetres.

FIG. 1 DETAIL OF RAILS AND STANCHIONS ARRANGEMENT

4.2.6 Stanchions forming walkways on freeboard decks should be similar to those shown in Fig. 2 (Type A).

4.3 Rails

4.3.1 Steel toprails shall be of 32 mm tubes (light quality) in accordance with IS : 1239 (Part I)-1979* or tubes having an equivalent section modulus, and be welded to stanchions.

4.3.2 Where wooden toprails are required, they shall be of 125 × 60 mm, made from first quality teak and free from defects, such as wanes, splits and checks. Other hardwoods or acceptable materials may be used provided that they are at least as suitable in all respects (*see* Fig. 4).

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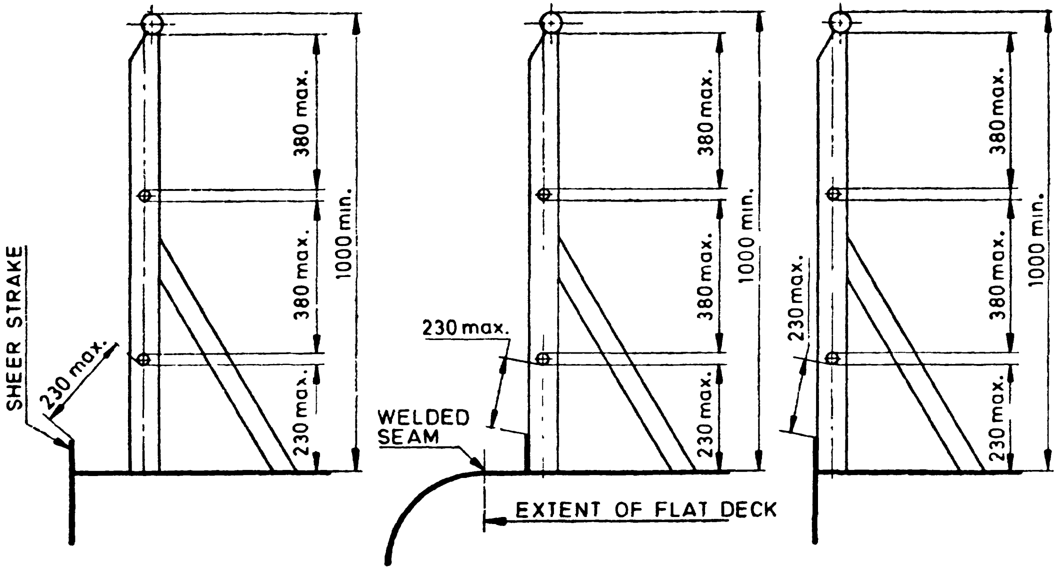
*Specification for mild steel tubes, tubulars and other wrought steel fittings: Part I Mild steel tubes (*third revision*).



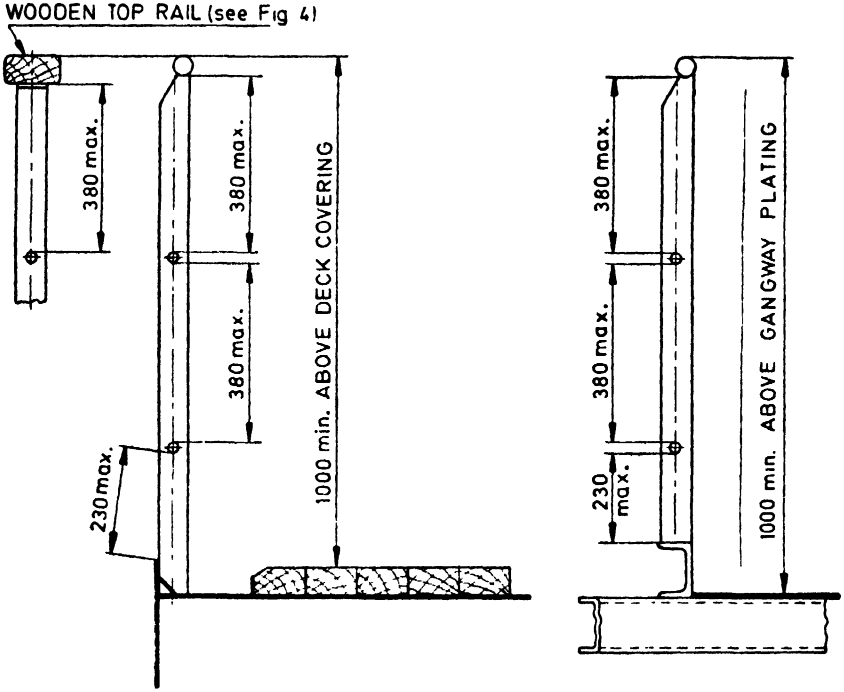
Type A Sheer Strake Arrangement (or Deck Walkway)

Type B Rounded Gunwale Arrangement

Type C Superstructure Arrangement

All dimensions in millimetres.

FIG. 2 TYPICAL STANCHION ARRANGEMENT FOR TYPES A, B AND C


WOODEN TOP RAIL (see Fig 4)
380 max.
380 max.
380 max.
230 max.
1000 min. ABOVE DECK COVERING
380 max.
380 max.
230 max.
1000 min. ABOVE GANGWAY PLATING

Type D Deck Covering Arrangement

Type E Gangway Arrangement

All dimensions in millimetres.

FIG. 3 TYPICAL STANCHION ARRANGEMENT FOR TYPES D AND E

4.3.3 Lower rails shall be of 20 mm diameter solid round bar. As an alternative, 20 mm tube (light quality) in accordance with IS : 1239 (Part I)-1979* or tubes having equivalent section modulus may be used. The rails shall be passed through holes in the stanchions. When the rails are not passing through stanchions they shall be supported at inside edge of stanchions by suitable clips (*see* Fig. 1). Rails shall not penetrate end stanchions.

4.3.4 Lengths of rail shall be continuous and shall be welded or joined only in way of stanchions.

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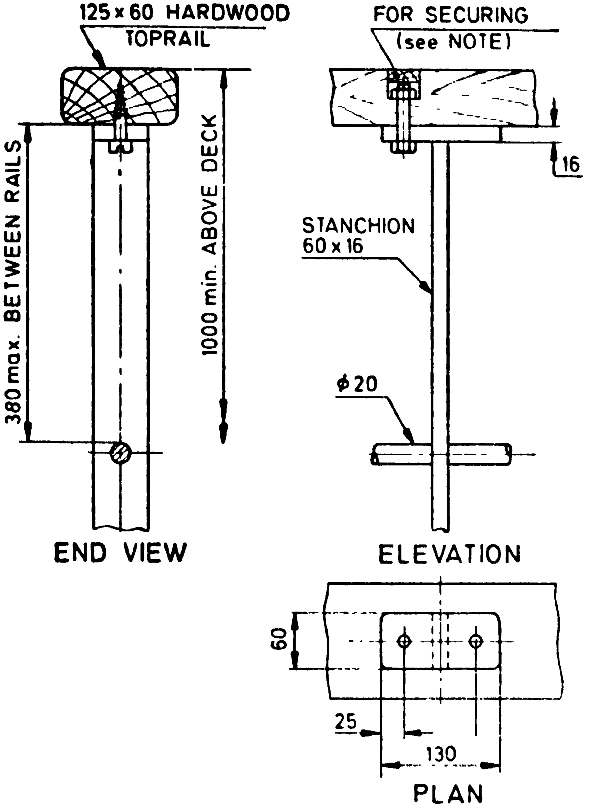
*Specification for mild steel tubes, tubulars and other wrought steel fittings: Part I Mild steel tubes (*third revision*).



NOTE — Toprail secured to pay by wood screw or M12 bolts, with nuts and washers recessed into counterbore, then dowelled.

All dimensions in millimetres.

FIG. 4 ARRANGEMENTS OF WOODEN TOPRAIL

4.4 Stays

4.4.1 Stays shall be of 60 × 16 mm flat bar or of flat bar having a section modulus at least equal to that of 60 × 16 mm flat bar.

4.4.2 A stay is not needed on every stanchion and shall generally be fitted at every third stanchion depending on length of guardrail and shipboard conditions.

4.4.3 The stay shall be welded to stanchions at about mid-height and under an angle of approximately 30°.

4.5 Fairlead Positions — Typical arrangements of guardrails at fairlead positions are shown in Fig. 5.

4.6 Ladder Handrails

4.6.1 Ladder handrails shall be fabricated from 32 mm tube (light quality) in accordance with IS : 1239 (Part I)-1979* and welded or bolted to ladder stringer (*see* Fig. 6).

4.6.2 The minimum bending radius shall be 100 mm to the inside surface of the tube (*see* Fig. 6).

4.6.3 The position of guardrail end stanchions at ladder positions shall be as shown in Fig. 7.

5. WORKMANSHIP AND FINISH

5.1 Guardrails and stanchions shall be manufactured with a minimum of distortion.

5.2 Guardrails and stanchions shall be free from defects and imperfections liable to cause injury to persons using them.

5.3 The rails, stanchions and stays be given protective finishes appropriate to their shipboard location. If galvanizing is applied it shall be carried out in accordance with IS : 4759-1968†.

5.4 The welding symbols used in the figures are in accordance with IS : 813-1961‡.

6. INSPECTION

6.1 The rails shall be subjected to visual inspection for freedom from defects and imperfections.

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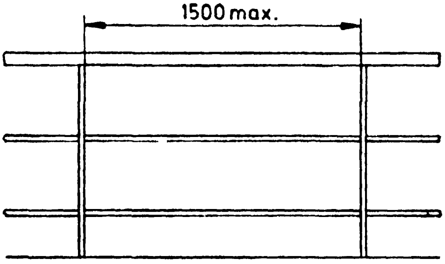
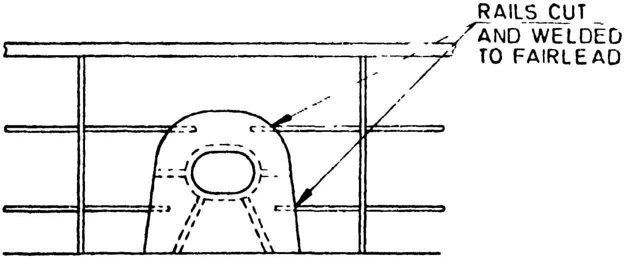
*Specification for mild steel tubes, tubulars and other wrought steel fittings: Part I Mild steel tubes (*third revision*).

†Specification for hot-dip zinc coatings on structural steel and other allied products.

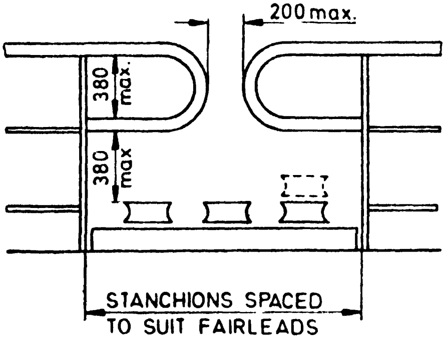
‡Scheme of symbols for welding.



STRAIGHT GUARDRAIL



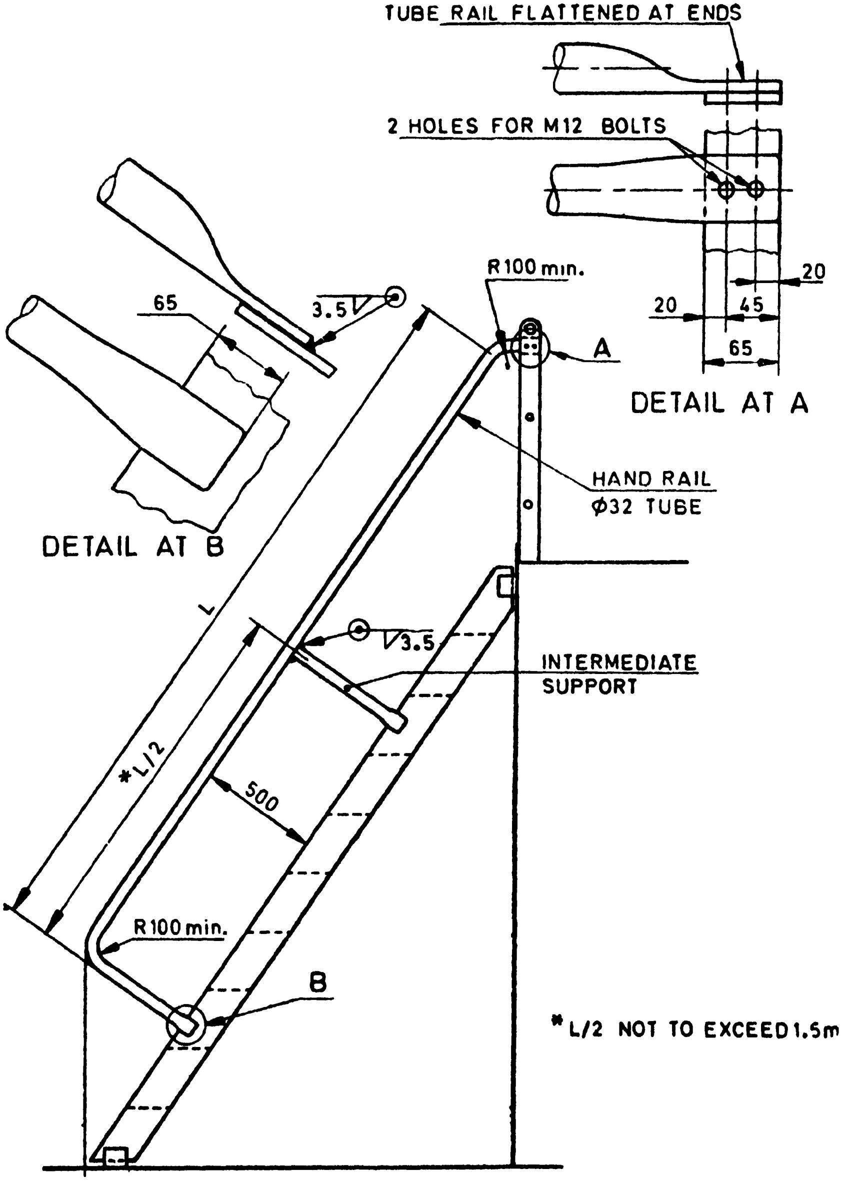
GUARDRAILS AT MULTIPURPOSE FAIRLEAD



GUARDRAILS AT ROLLER FAIRLEADS

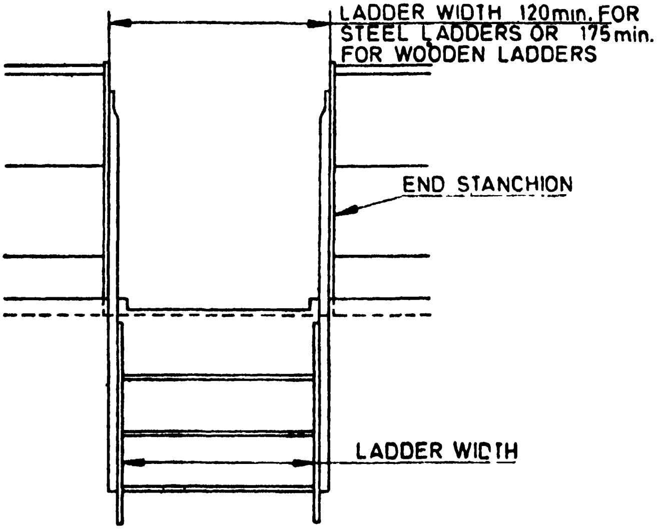
All dimensions in millimetres.

FIG. 5 ARRANGEMENTS OF GUARDRAILS

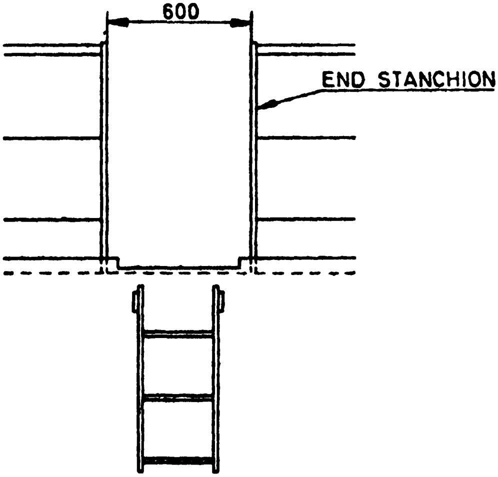


All dimensions in millimetres.

FIG. 6 HANDRAIL FOR LADDERS


LADDER WIDTH 120min. FOR STEEL LADDERS OR 175min. FOR WOODEN LADDERS
END STANCHION
LADDER WIDTH

ARRANGEMENT AT SLOPING LADDERS



ARRANGEMENT AT VERTICAL LADDERS

All dimensions in millimetres.

FIG. 7 TYPICAL ARRANGEMENTS OF GUARDRAILS AT LADDERS

INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

Quantity	*Unit*	*Symbol*
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

Quantity	*Unit*	*Symbol*
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

Quantity	*Unit*	*Symbol*	*Definition*
Force	newton	N	1 N = 1 kg. m/s^2
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m^2
Frequency	hertz	Hz	1 Hz = 1 c/s (s^{-1})
Electric conductance	siemens	S	1 S = 1 A/V
Electromotive force	volt	V	1 V = 1 W/A
Pressure, stress	pascal	Pa	1 Pa = 1 N/m^2

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